SONY

LCD Monitor

LMD-320W
LMD-230W
LMD-210
LMD-170W

Multiformat Engine Unit

MEU-WX1

LUMA

Sony Professional LCD Monitor

A Revolution in Professional Picture Monitoring

Combining decades of expertise in professional A/V technology with today's stunning advancements in LCD panel technology, Sony expands its LUMA™ Series product line-up – LCD monitors that meet the quality-critical needs of professional picture monitoring.

Unlike typical LCD monitors, the LUMA Series places maximum emphasis on monitoring video images. The superb quality LCD panel provides an extremely high level of brightness, contrast, and color depth. A wide variety of SD and HD signal inputs are accepted, both in analog and digital formats. And to perform best in today's environments, Sony's original I/P conversion and X-Algorithm technologies allow SD interlace signals to be displayed on the progressive LCD pixel array very naturally, unlike conventional LCD monitors which are prone to producing jaggy noise along the oblique direction of fast moving objects.

A huge appeal of the LUMA Series is its two-piece design, consisting of the LCD display (LMD) and the signal processor (MEU). This approach allows the LCD display to be as lightweight and slim as possible for high operational convenience and mounting flexibility.

Four LCD display sizes are offered in the LUMA Series, to suit the different needs in a variety of production and other applications. Panel sizes* range from the 17-inch LCD display with DC-operation capability, to the large 32-inch display for main monitor and multi-screen use.

With all these benefits, and with the operational controls that Sony Professional monitors are acclaimed for, the LUMA Series combines quality and convenience into one.

* Viewable area, measured diagonally

Features

LUMA Series Line-Up

LMD-320W

LMD-230W

LMD-210

LMD-170W

Choice of LCD Display Panels

Four LCD display sizes are available. Each LCD display uses one signal-processing unit (MEU-WX1) for control and signal interface.

Model name	Aspect Ratio	Panel Size*
LMD-320W	Wide	32-inches
LMD-230W	Wide	23-inches
LMD-210	4:3	21-inches
LMD-170W	Wide	17-inches

* Viewable area, measured diagonally

Flat Panel Design with Separate Signal-Processing Unit

LUMA Series monitors have been designed to make installation as easy and as flexible as possible. They consist of extremely thin and lightweight LCD displays, and a highly advanced signal-processing unit (Multiformat Engine Unit (MEU-WX1)) that can accept almost any type of HD or SD input format. This 'separate unit' approach not only allows the LCD display to be made as thin and as lightweight as possible, but it also allows flexible placement of monitor controls and interface connectors. The LCD display and Multiformat Engine Unit are connected via a single multi-pin cable*, up to 10 meters long (optional), which avoids having multiple cables hanging from the LCD displays themselves. The optional monitor stand SU-558 has a biaxial joint in its neck assembly, allowing the LCD displays to be positioned at various heights and tilt angles – meeting a wide range of application needs.

* The LMD-230W, LMD-210 and LMD-170W are supplied with one 1.8 meter cable, and the LMD-320W with one 3.0 meter cable.

LMD-230W with MEU-WX1

Superb Picture Performance

Sophisticated I/P Conversion using X-Algorithm

Handling interlace signals with LCD monitors can be a difficult task, but with the LUMA Series, this concern is a thing of the past. This is because they combine sophisticated I/P conversion with Sony's original X-Algorithm technology to obtain the best results for both static and moving areas of the picture.

With conventional LCD monitors, interlace signals are displayed on the progressive LCD pixel array by combining two adjacent picture fields into one picture frame. Since each frame is formed by two fields, this method is effective for static areas of the image, but it can often result in jagged shape noise along the oblique direction of fast-moving objects.

To avoid this, the LUMA Series uses a picture adaptive Still Mode and Motion Mode in the I/P conversion process. By comparison of the pixels in the proceeding and following fields, the I/P conversion will operate in either Still or Motion Mode. For pixels where motion is not detected, the I/P conversion will simply copy pixels from the proceeding field to create the absent scanning line.

In contrast, when motion is detected, picture frames are created from interlace signals on a field basis by interpolating every other line. Sony's innovative X-Algorithm technology intelligently compares the pixels above, below, and in the diagonal direction of the moving picture part, and then inserts a natural scanning line.

The direct result of this adaptive I/P conversion is much smoother image reproduction for pictures both in the still and moving areas.

*X-Algorithm is used for 480/60I and 575/50I signals only.

AR-Coated Protection Panel

The LCD panels of the LUMA Series use a robust AR-coated protection layer, which minimizes the chance of scratching the panel during transportation. The AR coating has two unique characteristics: it provides a high transmission rate of the internal light source to keep the picture as bright as possible, while keeping reflection from ambient light to a minimum. As a result, when used in bright lighting conditions, high contrast is still maintained in dark areas of the picture – a clear benefit over CRT monitors.

Excellent Brightness and Contrast

While conventional LCD monitors can tend to be dark, the LUMA Series provides high-brightness and high-contrast images by use of super-wide aperture LCD panels. In addition, the use of precisely manufactured RGB color filters allows these monitors to reproduce colors with stunning depth and saturation – creating highly natural images.

Wide Viewing Angle

The LCD panels used in the LUMA Series have a wide viewing angle of 170 degrees, horizontally and vertically, with minimal reduction in picture contrast. This allows images to be viewed from various positions and angles.

Input Versatility

Multi-Format Signal Support

LUMA Series monitors are designed for operations today, and for DTV operations tomorrow. The MEU-WX1 can accept almost any SD or HD video format, both analog and digital. These include composite NTSC and PAL, component 480/60I and 575/50I, progressive 480/60P and 576/50P, and high-definition 1080/50I, 1080/60I, and 720/60P. The MEU-WX1 can also accept 1080/24PsF and 1080/25PsF.

The MEU-WX1 comes equipped with typical analog interfaces as standard, including composite (NTSC/PAL), component (525/625), RGB, and Y/C*[1]. Digital interfaces are offered as optional boards to meet budgetary and user needs.

To keep the unit compact in size (1RU high), the analog inputs share the same four BNC connectors, which all provide loop-through capability.

The MEU-WX1 additionally accepts input from various types of analog computer signals. With its high-performance scan converter, it can accept input signals from VGA to SXGA*[2].

*1 Y/C signals must be input via the BNC connectors of the MEU-WX1 using an S-Video-to-BNC conversion connector.

*2 SXGA images are downconverted for display.

Video Signal Formats

System	Horizontal Scanning frequency (kHz)	Total lines per frame	Active lines per frame	Vertical scanning frequency (Hz)	Aspect	Compo-site Y/C	RGB Compo-nent	Input adaptor		
								BKM-220D	BKM-243HS	BKM-255DV
575/50I	15.625	625	575	50	16:9/4:3	O	O	O	O	O
480/60I	15.734	525	483	60	16:9/4:3	O	O	O	O	O
576/50P	31.250	625	576	50	16:9/4:3	–	O	–	–	–
480/60P	31.469	525	483	60	16:9/4:3	–	O	–	–	–
1080/24PsF	27.000	1125	1080	48	16:9	–	O	–	O	–
1080/50I	28.125	1125	1080	50	16:9	–	O	–	O	–
1035/60I	33.750	1125	1035	60	16:9	–	O	–	O	–
1080/60I	33.750	1125	1080	60	16:9	–	O	–	O	–
720/60P	45.000	750	720	60	16:9	–	O	–	O	–

Signal-Interface Options

The MEU-WX1 can accept HD-SDI, SD-SDI, or DV signals via the following optional input adaptors.

SDI 4:2:2 Input Adaptor **BKM-220D**

- SD-SDI signal input (x2) • SD-SDI monitor output (x1)
- Power consumption: 1.5 W

* Embedded audio is supported.

HD/D1-SDI Input Adaptor **BKM-243HS**

- HD-SDI/SD-SDI signal input (x2) • SD-SDI/HD-SDI monitor output (x1)
- Power consumption: 2 W

* HD-SDI and SD-SDI signals are automatically detected.

* Embedded audio is supported.

DV Input Adaptor **BKM-255DV**

- DV signal port (x 2) • Power consumption: 4 W

* Embedded audio is supported.

* The BKM-255DV accepts DV signals. However, the full command set of the AV/C (Audio/Video and Control) protocol is not supported.

* Although a 6-pin connector is used, power is not supplied through this port.

Preset Computer Input Frequencies

The MEU-WX1 is factory preset to accept 16 typical computer input signal frequencies.

Preset Input Frequencies

No.		Preset Signal	fH [kHz]	fV [Hz]	H/V
P01	640 x 480	VGA mode 3	31.469	59.940	N/N
P02		VGA VESA 75 Hz	37.500	75.000	N/N
P03		VGA VESA 85 Hz	43.269	85.008	N/N
P04		VGA (non-CRT)	29.531	59.780	P/N
P05	800 x 600	SVGA VESA 60 Hz	37.879	60.317	P/P
P06		SVGA VESA 75 Hz	46.875	75.000	P/P
P07		SVGA VESA 85 Hz	53.674	85.061	P/P
P08		SVGA (non-CRT)	36.979	59.837	P/N
P09	1024 x 768	XGA VESA 60 Hz	48.363	60.004	N/N
P10		XGA VESA 75 Hz	60.023	75.029	P/P
P11		XGA VESA 85 Hz	68.677	84.997	P/P
P12	1280 x 768	WXGA (CRT 60 Hz)	47.693	59.992	N/P
P13		WXGA (non-CRT)	47.396	59.995	P/N
P14	1280 x 1024	SXGA VESA 60 Hz	63.981	60.020	P/P
P15		SXGA (non-CRT)	63.194	59.957	P/N
P16	720 x 400	VGA TEXT	31.469	70.087	N/P

MEU-WX1

Front Panel

Rear Panel

Operational Convenience

Advanced Marker Settings

The LUMA Series can display various area markers, including a center marker, aspect markers, and a safety zone marker. The brightness of these markers can be selected from three different levels, white, gray, and dark gray.
What's more, users can select either a black or gray matte to fill the outer area of the aspect markers.
These flexible marker controls, together with the choice of many different aspect markers, make the LUMA Series an extremely convenient display device for a variety of shooting scenarios – from standard video acquisition to digital cinematography.

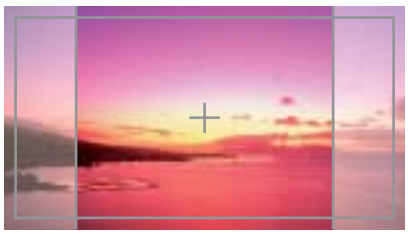
Marker Variation

	16:9 Mode	4:3 Mode
Aspect Marker	4:3, 15:9, 14:9, 13:9, 1.85:1, 2.35:1, 1.85:1 & 4:3	16:9
Center Marker	O	
Safety Area	80%, 88%, 90%, 93%	

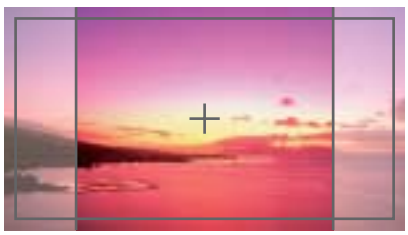
Marker examples

Half Tone Matte

Black Matte



Light Dark Marker Brightness



Dark Marker Brightness

Seven-Language On-Screen Display

The on-screen display is available in English, French, Spanish, German, Italian, Japanese, and Chinese.

Color Temperature/Gamma Selection

High/low color temperatures or user presets can be selected.

Selectable Scan Size for Video Input and Aspect Ratio

The screen size can be selected between 5% over-scan and 0% inscan modes. The aspect ratio can be switched between 16:9 and 4:3 according to the input signal.

Three-Color Tally

The LMD-230W, LMD-210, and LMD-170W displays come equipped with a tally lamp that can be lit up via a parallel remote connector. The status of the signal displayed on the monitor can be identified by the tally color – red, green, or amber.

Smart APA (Auto Pixel Alignment) for Computer Input

Image size can be automatically adjusted to its optimal setting with the one-touch APA key.

Parallel Remote Control

The MEU-WX1 can be controlled remotely via its parallel remote connector. There are 31 functions in the Remote menu (such as the ability to switch input signals), of which seven can be allocated to the connector.

Stereo Audio Monitoring

The MEU-WX1 is equipped with stereo speakers (0.5 W + 0.5 W), which enable the user to monitor audio.

Protected Controls

The key-inhibit function helps prevent inadvertent operations from the control panel.

LCD Monitor Advantages

By nature, the use of LCD technology in the LUMA Series eliminates many concerns inherent in CRT monitors. These include the elimination of convergence alignments, geometric distortion, flicker, and image burn-in. The LUMA Series is also completely resistant to magnetic fields, a factor that requires utmost care when installing a CRT monitor.

Mounting Flexibility

Mountable in a 19-Inch EIA Standard Rack

The LMD-170W (7U high) can be mounted in a 19-inch EIA standard rack with the optional Mounting Bracket MB-522. The MEU-WX1 (1U high) can be mounted in a 19-inch EIA standard rack with the supplied mounting bracket. Although wider than the 19-inch rack, if required, the LMD-210 (10U high) can also be rack mounted using the optional Mounting Bracket MB-523.

Mounting the LMD-320W

The large screen LMD-320W can also be mounted on the optional SU-559 Floor Stand or on a wall using the mounting hooks (370 x 370 mm pitch) on the rear of the display.

VESA Mounting

Complying with VESA standards, the LMD-230W, LMD-210, and LMD-170W can easily be mounted (75 x 75 mm pitch) on a wall or a ceiling. Although large-screen monitors, they remain thin and lightweight because the signal-processing circuitry is contained in the separate MEU-WX1. In addition, the arm of the displays can be adjusted with more flexibility because only one cable is required between the display and the MEU-WX1.

Other Features

- H/V Delay Function
- ACC Off
- DC Operation of the LMD-170W via the MEU-WX1*
- Setup Level for Analog Component and NTSC signal
- Sub Control on Contrast, Chroma, Phase, and Brightness
- Blue-Only Mode
- Monochrome Mode
- Auto Chroma/Phase Setup
- Power-Saving Function (computer input only)
- DDC-2B Plug and Play (computer input only)

* The SMF-600 Extension Cable cannot be used for DC operation.

Optional Accessories

- **BKM-220D**
  SDI 4:2:2 Input Adaptor

- **BKM-243HS**
  HD/D1-SDI Input Adaptor

- **SU-558**
  Monitor Stand
  (for LMD-230W, LDM-210 and LMD-170W)

- **MB-522**
  Mounting Bracket
  (for LMD-170W only)

- **BKM-255DV**
  DV Input Adaptor

- **SMF-600**
  Display IF Cable (10 m)

- **SU-559**
  Monitor Stand
  (for LMD-320W only)
- **MB-523**
  Mounting Bracket
  (for LMD-210 only)

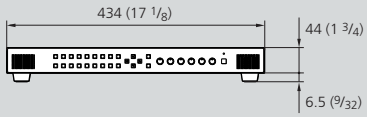
Specifications

Multiformat Engine Unit

MEU-WX1

Input/Output			
Input	Connector/Slot		
	G/Y/Composite	B/PB/S-Y	R/PR/S-C
	BNC, Loop through, automatic 75 Ω termination (x1)		
Composite	1.0 Vp-p ±3 dB, sync negative		
Y/C		1.0 Vp-p ±3 dB, sync negative	0.286 Vp-p ±3 dB (NTSC) 0.3 Vp-p ±3 dB (PAL)
Component		0.7 Vp-p ±3 dB	
RGB	0.7 Vp-p ±3 dB Sync on G 0.3Vp-p	0.7 Vp-p ±3 dB	0.7 Vp-p ±3 dB
Audio in (for Video signals)	Stereo mini jack (x1) -5 dBu, more than 47 kΩ		
OPTION A-1	Option Slot (x1)		
OPTION A-2			
OPTION B-1	Option Slot (x1)		
OPTION B-2			
Ext. sync	BNC, Loop-through, automatic 75 Ω termination 0.3 ~ 4 Vp-p ±3 dB, sync negative, usable tri-level sync signal 0.6 Vp-p ±3 dB		
Computer	HD D-sub 15-pin (female) (x1), 0.7 Vp-p, 75 Ω, positive (R,G,B)		
Audio in (for computer signals)	Stereo mini jack (x1) -5 dBu, more than 47 kΩ		
DC IN*	XLR 4-pin (male) (x1), 12 V, output impedance 0.05 Ω or less		
Output			
Audio monitor out	Stereo mini jack (x1)		
Speaker Out	Stereo (0.5 W + 0.5 W)		
PARALLEL Remote	Modular 8-pin (Assignable)		
Display Signal Out	Exclusive connector (x1)		
Display DC Out**	XLR 4-pin (female) (x1), DC 16.5 V (when AC power is supplied) DC 12 V (when DC power is supplied)		
Video			
Horizontal Scanning Frequency	15 to 45 kHz		
Frame Scanning Frequency	48 to 60 Hz		
Computer			
Dot clock	110 MHz		
Horizontal Scanning Frequency	28 to 69 kHz		
Vertical Scanning Frequency (frame)	60 to 85 Hz		
Plug & Play	DDC-2B		
General			
Power consumption	Maximum: Approx. 92 W (with 2 x BKM-243HS and LMD-230W) Standard: Approx. 26 W (without optional input adaptor)		
Power requirement	AC 100 to 240 V±10%, 50/60 Hz, DC 12 V (LMD-170W only)		
Operating Temperature	0 to 35 °C (32 to 95 °F)		
Operating Humidity	30 to 85% (no codensation)		
Storage and Trans. Temperature	-10 to 40 °C (14 to 104 °F)		
Storage & Transport Humidity	0 to 90%		
Operating/Storage/Trans. Pressure	700 to 1060 hPa		
Dimensions (W x H x D) (excluding protrusions)	434 x 44 x 305 mm (17 1/8 x 1 3/4 x 12 1/8 inches)		
Mass	Approx. 4.5 Kg (9 lb 15 oz)***		
Supplied Accessories	AC cord, AC plug holder, Mounting bracket, Operating instructions, CD-ROM, Warranty card		
Regulation Compliance	UL-1950, FCC Class-A, CSA C22.2 No.950 (c-UL), IC Class-A, EN60950, EN55103-1, EN55103-2, CE , VCCI Class-A, C-tick		

Dimensions
Unit: mm (inches)



*This connector is used to supply external DC power to the LMD-170W via the MEU. This feature is not available for other LMD monitors.
**This connector is not used when operating the LMD-320W since power to this monitor must be supplied separately.
***Excluding supplied accessories.

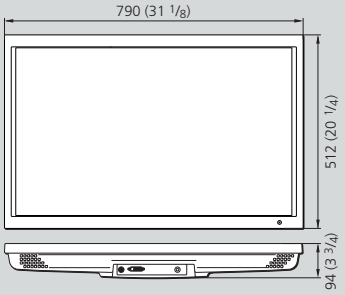
Specifications

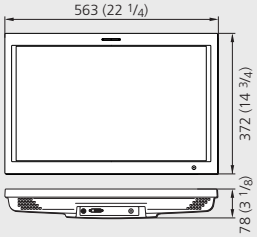
LCD Monitors

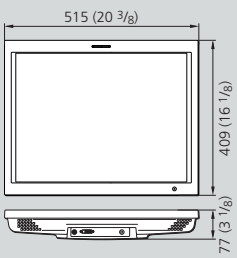
Picture Performance		
Type		
Resolution		
Pixel efficiency		
Dot pitch		
Picture Size (H x W) (Diagonal)		
Aspect		
Colors		
Viewing Angle		
Input		
Display Input connector		
Digital input		
Dot clock		
Scanning Frequency	Horizontal	
	Vertical	
General		
Power Consumption		
Power requirement		
Operating Temperature		
Operating Humidity		
Storage & Transport Temperature		
Storage & Transport Humidity		
Operating/Storage/Trans. Pressure		
Dimensions (W x H x D)		
Mass		
Supplied Accessories		
Regulation Compliance		

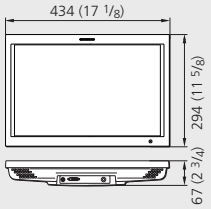
Dimensions
Unit: mm (inches)

LMD-320W	LMD-230W with the optional SU-558 monitor stand	LMD-210 with the optional SU-558 monitor stand	LMD-170W with the optional SU-558 monitor stand
a-Si TFT Active Matrix LCD with an AR-coated protection panel			
1280 x 768 dots	1280 x 768 dots	1024 x 768 dots	1280 x 768 dots
99.99%			
0.537 x 0.537 mm	0.3915 x 0.3915 mm	0.420 x 0.420 mm	0.291 x 0.291 mm
Approx. 687 x 412 mm (27 x 16 2/9 inches) 32-inch (801.59 mm)	Approx. 501 x 301 mm (19 3/4 x 11 7/8 inches) 23-inch (584.40 mm)	Approx. 430 x 323 mm (17 x 12 5/7 inches) 21-inch (537.60 mm)	Approx. 372 x 223 mm (14 3/4 x 8 7/8 inches) 17-inch (434.38 mm)
15:9	15:9	4:3	15:9
16,770,000 colors			
85°/85°/85°/85° (typical) (up/down/left/right contrast>10:1)			
DVI-D			
25.175 MHz 68.250 MHz	25.175 MHz 68.250 MHz	25.175 MHz 65.000 MHz	25.175 MHz 68.250 MHz
31.469 kHz 47.396 kHz	31.469 kHz 47.396 kHz	31.469 kHz 48.363 kHz	31.469 kHz 47.396 kHz
59.940 Hz 59.995 Hz	59.940 Hz 59.995 Hz	59.940 Hz 60.004 Hz	59.940 Hz 59.995 Hz
Approx. 150 W	Approx. 62 W	Approx. 70 W	Approx. 42 W
AC 100 to 240 V ± 10%, 50/60 Hz	DC16.5 V	DC16.5 V	DC12 V, DC16.5 V
0 to 35 °C (32 to 95 °F)			
30 to 80% (no condensation)			
-10 to 40 °C (14 to 104 °F)			
0 to 80%			
700 to 1060 hPa			
790 x 512 x 94 mm * (31 1/8 x 20 1/4 x 3 3/4 inches) *	563 x 372 x 78 mm * (22 1/4 x 14 3/4 x 3 1/8 inches) *	515 x 409 x 77 mm * (20 3/8 x 16 1/8 x 3 1/8 inches) *	434 x 294 x 67 mm * (17 1/8 x 11 5/8 x 2 3/4 inches) *
Approx. 25 Kg (55 lb 2 oz)*	Approx. 6.6 Kg (14 lb 9 oz)* Approx. 11.8 Kg (26 lb)**	Approx. 7 Kg (15 lb 7 oz)* Approx. 12.2 Kg (26 lb 14 oz)**	Approx. 4.9 Kg (10 lb 13 oz)* Approx. 10.1 Kg (22 lb 4 oz)**
AC cord, AC plug holder, Display interface cable, Warranty card, Operating instructions	Display interface cable, Warranty card, Operating instructions		
UL-1950, FCC Class-A, CSA C22.2 No.950 (c-UL), IC Class-A, EN60950, EN55103-1, EN55103-2, CE , VCCI Class-A, C-tick			









*without the optional monitor stand and not including the projection parts.
**with the optional SU-558 monitor stand.

SONY

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